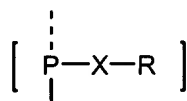


may be addressed to the microlocations by the application of an electronic potential to the microelectrode, and wherein at least some of the microelectrodes are covered by a permeation layer comprising at least a first chemical group for attaching to the microarray biomolecules, the first group having the formula:



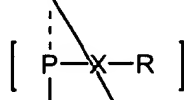
wherein,

**P** is a polymerizable moiety covalently attached to one or two moieties selected from the group consisting of: a monomeric unit of the permeation layer and another P-X-R group, as defined herein, wherein the other P-X-R group may be the same as or different from the first P-X-R group, further wherein the dashed line is a covalent bond to the second moiety if P is covalently attached to two moieties;

**X** is a covalent bond or a linking moiety; and

**R** is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule, or for attaching covalently another P-X-R group, as defined herein, wherein the other P-X-R group may be the same as or different from the first P-X-R group, and wherein R may, optionally, be attached to a biomolecule or another P-X-R group.

- D1
14. (THRICE AMENDED) An electronically addressable microchip device comprising a plurality of electronically addressable microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, wherein biomolecules may be addressed to the microlocations by the application of an electronic potential to the microelectrode, wherein at least some of the microelectrodes are covered by a permeation
- D2 SUB 157



layer comprising first and second chemical groups having the formula

wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties

P is a polymerizable moiety,

X is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, and carbonyls, and any combinations thereof; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule;

wherein the first and second P-X-R groups may be the same or different;

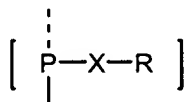
wherein the P moieties of the first P-X-R groups are covalently attached to the permeation layer matrix and to one P of the second P-X-R groups;

and wherein the P moieties of the second P-X-R groups are covalently attached to one or two other P moieties of other second P-X-R groups to form a polymer of the second P-X-R groups.

D2

21. (THRICE AMENDED) An electronically addressable microchip device comprising a plurality of electronically addressable microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, wherein biomolecules may be addressed to the microlocations by the application of an electronic potential to the microelectrode, wherein at least some of the microelectrodes are covered by a permeation

D3  
Sub  
e9



layer comprising first P-X-R groups and second P-X-R groups having the formula:

wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties;

**P** is a polymerizable moiety,

**X** is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, and carbonyls, and any combinations thereof; and

**R** is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule;

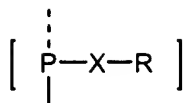
wherein the first and second P-X-R groups may be the same or different;

wherein the **P** moieties of the first P-X-R groups are covalently attached to the permeation layer matrix

wherein the **R** of the first P-X-R group is covalently attached to at least one **P** of the second P-X-R groups;

and wherein the **P** moieties of the second P-X-R groups are covalently attached to one or two other **P** moieties of other second P-X-R groups to form a polymer of the second P-X-R groups.

28. (THRICE AMENDED) An electronically addressable microchip device comprising a plurality of electronically addressable microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, wherein biomolecules may be addressed to the microlocations by the application of an electronic potential to the microelectrode, wherein at least some of the microelectrodes are covered by a permeation layer comprising first P-X-R groups attached to one or two moieties selected from the group consisting of biomolecules and polymerized monomer units comprising second P-X-R groups, wherein the polymerized second P-X-R groups are further attached to biomolecules, wherein the attachment of the biomolecules to the first P-X-R groups or to the polymerized second P-X-R groups requires activation of at least one of the first and/or the second P-X-R groups under acidic and/or basic pH conditions, wherein the first and second P-X-R groups have the formula



wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties;

**P** is a polymerizable moiety, wherein;

**X** is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, and carbonyls, and any combinations thereof; and

**R** is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule or for attaching covalently an other P-X-R group;

wherein **P** comprises a chemical element requiring activation for attaching to the permeation layer and/or to a **P** of an other P-X-R group;

and wherein **R** comprises chemical elements requiring activation different from **P** of either the first or second P-X-R groups for attaching to biomolecules, or to **P** of another P-X-R groups.

D4